

Claims

- [c1] 1. A wafer surface ion sampling system, comprising:
a sampling chamber, comprised an upper part and a lower part, wherein the upper part accommodates a wafer, and the lower part has a funnel shape and comprises an extract solution collection opening;
a wafer carrier apparatus, disposed in the sampling chamber;
an extraction liquid spraying apparatus, disposed at a top part of the sampling chamber to spray an extraction liquid on a surface of the wafer; and
an extraction liquid supply apparatus, connected to the extraction liquid spraying apparatus to provide the extraction liquid to the extraction liquid spraying apparatus.
- [c2] 2. The system of claim 1, wherein the wafer carrier apparatus comprises a plurality of wafer carrier beams, arranged around an upper part of a sidewall of the sampling chamber dispersedly, wherein each wafer carrier beam comprises a first wafer anchoring pin disposed on a peripheral surface of the wafer carrier beam, wherein the wafer anchoring pin extends in a first direction.

- [c3] 3. The system of claim 2, wherein one end of each of the wafer carrier beams extends through the uppersidewall of the sampling chamber for the wafer carrier beam to rotate freely.
- [c4] 4. The system of claim 3, wherein the wafer carrier apparatus further comprises a rotating handle disposed on the one end of the wafer carrier beam.
- [c5] 5. The system of claim 2, wherein the peripheral surface of the wafer carrier beam further comprises a second wafer anchoring pin that extends in a second direction, wherein the second direction is different from the first direction.
- [c6] 6. The system of claim 2, wherein there are at least three wafer carrier beams.
- [c7] 7. The system of claim 2, wherein at least a height of one of the wafer carrier beams is lower than a height of the other wafer carrier beams.
- [c8] 8. The system of claim 1, wherein the extraction liquid spraying apparatus comprises a plurality of spray nozzles or nebulizers, evenly disposed at the top part of the sampling chamber.
- [c9] 9. The system of claim 1, wherein the extraction liquid

supply apparatus further comprises a temperature adjustment device to control a temperature of the extraction liquid.

[c10] 10. The system of claim 1 further comprising a cleaning/drying apparatus, wherein the cleaning/drying apparatus comprises:

a cleaning/drying spray nozzle, disposed in the sampling chamber to spray a cleaning solution or a fluid into the sampling chamber;

a cleaning solution supply apparatus, connected to the cleaning/spray nozzle to supply the cleaning solution to the cleaning/drying spray nozzle; and

a fluid supply apparatus, connected to the cleaning/drying spray nozzle to supply the fluid to the cleaning/drying spray nozzle.

[c11] 11. The system of claim 10, wherein the cleaning solution supply apparatus comprises a temperature adjustment device to control a temperature of the cleaning solution.

[c12] 12. The system of claim 10, wherein the fluid supply apparatus further comprises a temperature adjustment device to control a temperature of the fluid.

[c13] 13. A wafer surface ion sampling system, comprising:

a sampling chamber which comprises an upper part and a lower part, wherein the upper part accommodates a wafer, and the lower part is funnel shape and comprises an extract solution collection opening;

a wafer carrier apparatus, disposed in the sampling chamber;

a wafer carrier apparatus driving system, connected to the wafer carrier apparatus, wherein the wafer carrier apparatus driving system drives the wafer carrier apparatus to rotate;

an extraction liquid spraying apparatus, disposed at a top part of the sampling chamber;

a moving device, wherein the moving device holds and moves the extraction liquid spraying apparatus;

an extraction liquid supply apparatus, connected to the extraction liquid spraying apparatus;

a cleaning/drying spray nozzle, disposed in the sampling chamber to spray a cleaning solution or a fluid into the sampling chamber;

a cleaning solution supply apparatus, connected to the cleaning/drying spray nozzle to supply the cleaning solution to the cleaning/drying spray nozzle; and

a fluid supply apparatus, connected to the cleaning/drying spray nozzle to supply a fluid to the cleaning/drying spray nozzle.

- [c14] 14. The system of claim 13, wherein the wafer carrier apparatus further comprises:
a carrier platform;
a rotating shaft, coaxially connected with the carrier platform; and
a carrier platform adjustment unit, disposed between the carrier platform and the rotating shaft.
- [c15] 15. The system of claim 13, wherein the extraction liquid spraying apparatus comprises a spray nozzle or a nebulizer.
- [c16] 16. The system of claim 13, wherein the extraction liquid supply apparatus further comprises a temperature adjustment device to control a temperature of an extraction liquid.
- [c17] 17. The system of claim 13, wherein the cleaning solution supply apparatus further comprises a temperature adjustment device to control a temperature of the cleaning solution.
- [c18] 18. The system of claim 13, wherein the fluid supply apparatus comprises a temperature adjustment device to control a temperature of the fluid.
- [c19] 19. A wafer surface ion sampling method, comprising:
(a) providing a wafer;

- (b) placing the wafer inside a sampling chamber;
- (c) continuously spraying an extraction liquid on a surface of the wafer to form a liquid film and to maintain a thickness of the liquid film to dissolve ion contaminants on the surface of the wafer into the extraction liquid; and
- (d) collecting an extract solution at a bottom of the sampling chamber.

[c20] 20. The method of claim 19, wherein continuously spraying the extraction liquid on the wafer surface to form the liquid film and to maintain the thickness of the liquid film to dissolve ion contaminants on the surface of the wafer into the extraction liquid further comprises a step of tilting the wafer at an angle to allow a portion of the extraction liquid to flow to the bottom of the sampling chamber.

[c21] 21. The method of claim 19, wherein continuously spraying the extraction liquid on the wafer surface to form the liquid film and to maintain the thickness of the liquid film to dissolve ion contaminants on the surface of the wafer into the extraction liquid further comprises a step of rotating the wafer to allow a portion of the extraction liquid to flow to the bottom of the sampling chamber.

[c22] 22. The method of claim 21, wherein a rotating speed of

the wafer is controlled to control the thickness of the liquid film.